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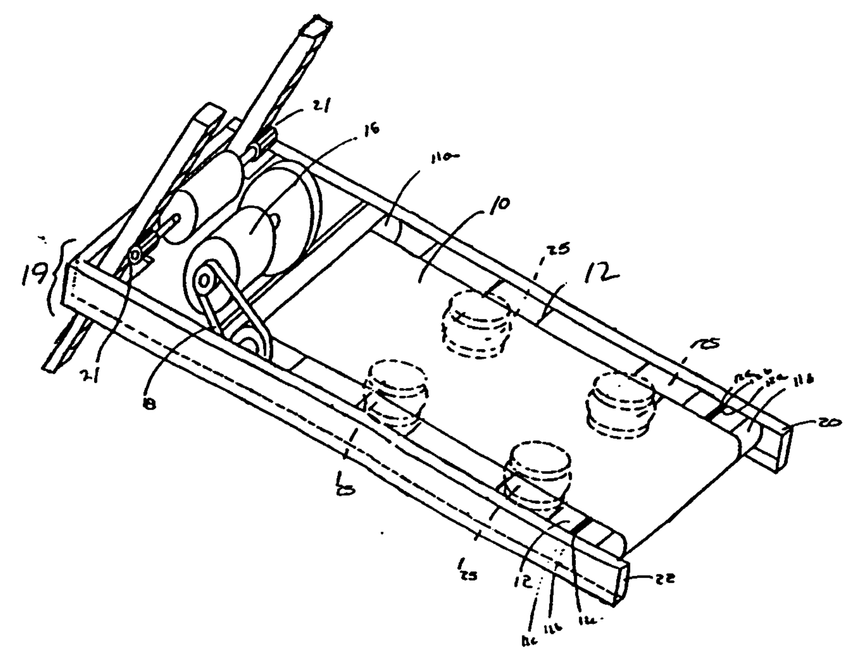

(57) Abstract

An exercice treadmill which improves user safety and increases treadmill durability and life. The treadmill contains a three-ply platform over which the tread (10) on which the user stands travels. The platform is fully suspended, preferably by an air spring suspension (25) which absorbs the impact of user footfalls and the reaction forces of the treadmill user. The treadmill frame (19) also contains a removable sidepiece which permits access to the air springs and other treadmill serviceable components. Maintenance can thus be accomplished with less difficulty and in less time.

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TREADMILL EXERCISING DEVICE

BACKGROUND OF THE INVENTION

This invention relates to exercise treadmills. The typical treadmill comprises a continuous belt, or tread, which is wrapped around a pair of rollers and driven by a motor. The treadmill user must walk or run on the belt at a rate which matches the belt speed to remain stationary relative to the device. The treadmill permits the user to simulate walking or running in an indoor environment.

Exercise treadmills are found in a variety of applications. For example, treadmills frequently see service as a medical diagnostic tool, as a physical fitness device and/or as a therapeutic apparatus. In each of these applications, the treadmill is subjected to the repeated footfalls of its users. It is estimated that a treadmill machine in daily use must withstand tens of millions of footfalls a year. The shock of these impacts is not insignificant and accelerates wear of treadmill components. As a result, mean time between failure and overall treadmill life are negatively affected. Wear of treadmill components caused by frequent operation and repeated footfalls necessitates implementation of a maintenance schedule. Construction of the typical treadmill device makes access to serviceable components such as rollers, drive belts, the tread and platform difficult. Repair, replacement and lubrication of these parts thus entails a significant amount of labor and cost.

The impact of the user with the treadmill not only causes treadmill wear, but also presents a potential source of injury for the user. Foot, leg, joint and back problems are types of potential injury. These injuries can result from the reaction forces and vibrations of the treadmill on the user.

SUMMARY OF THE INVENTION

The present invention increases treadmill durability and mean time between failure while improving user safety and reducing the risk of injury. The present invention also improves treadmill life and user safety by its unique construction which provides easy access to serviceable components.

The treadmill of the present invention, provides a suspension system for the platform over which the tread passes. Previous devices used a platform which either was not suspended or was only partially suspended, for example, by being pivotally suspended or cantilevered. According to the present invention, the platform is fully suspended. By "fully suspended" it is meant that the plane of the platform can be tilted in any direction from its rest position. E.g., a platform constrained to pivot about an axis is not fully suspended since it cannot tilt in a direction at an angle to such axis. The suspension means will tend to restore the platform thus tilted back to its rest position. To define the rest position of the platform, three or, preferably, four, independent suspension devices are used to suspend the platform. Preferably, the platform is suspended with respect to the frame of the treadmill system.

In one embodiment, the suspension system includes a set of air springs which absorb the shock of the user's footfalls. This suspension system not only reduces the risk of leg, back and joint injury caused by repeated footfalls, but also makes the machine more pleasurable to use thereby extending the exercise, diagnostic and therapeutic benefits to more users. The suspension system also reduces the dynamic loading on the treadmill apparatus and components thereby improving system reliability and life.

The suspension system of the current invention has the further advantage of improved performance over treadmills incorporating steel coil springs or certain other shock absorption devices to partially damp the impact of the user's motion. Air springs damp out more of this impact force. The nonlinear load response of the air springs also means that the

suspension system of the present invention provides shock absorption benefits over a wider range of user size, weight, strength and ability than certain other suspension systems.

According to another feature of the present invention, the treadmill right sidepiece is readily removable. This feature allows easy access to the air springs and to other serviceable components. Treadmill maintenance is therefore less costly and more trouble free. Less onerous maintenance also yields improvements in treadmill life and safety since proper maintenance is more likely to occur. Removal of right sidepiece and servicing is facilitated by using the quick disconnect coupling which elevates the right side of the machine.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows an overall perspective view of a treadmill device according to an embodiment of the present invention;

Fig. 2A shows an air spring representative of those suitable for use in an embodiment of the present invention;

Fig. 2B shows a cross-section of an air spring suitable for use in an embodiment of the present invention in a noncollapsed position.

Fig. 2C shows a cross-section of an air spring suitable for use in an embodiment of the present invention in a collapsed position.

Fig. 3 shows a representative force v. height curve for an air spring suitable for use in an embodiment of the present invention;

Fig. 4 shows a top view of a treadmill incorporating a removable frame sidepiece according to an embodiment of the present invention;

Fig. 4A shows an end view of a treadmill rear portion incorporating a removable frame side piece according to an embodiment of the present invention;

Fig. 5 shows a side view of a treadmill having a removable frame sidepiece according to an embodiment of the present invention;

Fig. 6 shows a end view of a treadmill front portion having a treadmill elevation mechanism according to an embodiment of the present invention;

Fig. 7 shows a flexible shaft coupling suitable for use in an embodiment of the present invention; and

Fig. 8 shows a side view of an elevated treadmill according to an embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 1 shows an overall view of a treadmill device according to an embodiment of the present invention. The treadmill user stands on a belt, or tread, 10 which loops around rollers 11a and 11b and is supported by a three-ply plate 12. A variable speed motor 16 transmits a force via drive belt 18 to rotate roller 11a and advance the tread. Motor 16 speed can be selected by the user. The entire device is supported by a frame structure 19 which consists partially of removable sidepiece 20, and which may also be tilted to simulate an incline, e.g., using a motor-activated rack-and-pinion device 21.

In the preferred embodiment, frame 19 is constructed from aluminum. The light weight of aluminum makes it an advantageous material for construction of a treadmill; especially treadmill models which must be partially tilted to simulate an incline. Aluminum also has favorable characteristics as a heat sink for treadmill electronics. Alternately, frame 19 may be fabricated from steel. Steel is less expensive and easier to weld than aluminum. Frame 19 can, however, be constructed from a variety of other materials but, such a material should preferably be lightweight, inexpensive, durable, act as a heat sink for electronics, and possess good fatigue and corrosion resistance. Once fabricated, frame 19 may be painted or covered, e.g. with a plastic wall.

Belt 10 should be fabricated to provide durability and proper traction. Several treadmill belts are available from a variety of manufacturers. Each has different plies and different weaves. In the preferred embodiment, a belt model HAR-12E manufactured by Habasit Belting, Inc. of Atlanta,

Georgia proves suitable. This belt has a bottom layer of fiber weave material, a middle layer of carbon for static dissipation and a top neoprene rubber layer.

A plate 12, forms part of the support platform for tread 10. The plate 12 should be sufficiently stiff to remain essentially level with the treadmill frame and not deflect or deform significantly under the weight and footfalls of the user. In a possible embodiment, the plate 12 has 3 plies with the bottom ply 12a formed of an aluminum frame. A plywood sheet comprises the middle ply 12b. The top ply 12c should provide lubrication for the tread/plate interface. One possible top plate is a Tredex Board, manufactured by Greenwood Forrest Products, Inc., 5895 S.W. Jean Rd., Lake Oswego, Oregon 97035, which has a hardboard core having a high density overlay top and bottom to which a wax lubricant is applied. Other possible materials with which to fabricate ply 12c include polyethylene, Teflon™, Formica™ bonded on wood, Ryton™ coated on aluminum, and mirror-polished stainless steel. Polyethylene, however, does have a tendency to melt in response to friction. Ultimately, the choice of panel material will vary depending on the type of belt used.

Air springs 25 are used to support three-ply plate 12 with respect to the treadmill frame and also to provide shock absorption and vibration isolation. Air springs 25 are located in a parallelogram arrangement near the corners of plate 12 as is shown in Fig. 1. This arrangement suspends the plate/tread structure completely on air springs 25 and plate 12 is not cantilevered or otherwise partially suspended. An arrangement of three springs may also be used; however, the parallelogram arrangement improves stability.

Air springs are high strength flexible air containers sealed by retainers at each end. Air pressure inside the flexible container serves as an energy absorbing medium which absorbs shock and vibration. Fig. 2A shows an air spring in isolation. The flex member 28 is built with a rubber lining and outer cover, reinforced with high strength synthetic fabric. Flex member 28 is fitted with rust-resistent retainers 30, 31 at each end. As shown in Figs. 2B and 2C, in the

preferred embodiment, both retainers have blind taps 34 used for mounting air spring 25 to plate 12 and the frame 19. Upper retainer 30 also contains an air fitting 36. Air fitting 36 may be used to initially fill the air spring with the appropriate mass of air and to periodically adjust the air pressure level as desired. Suspension devices other than airsprings are operable. However, the durable construction of the air spring makes its use preferable over use of less durable elastomer bumpers; hydraulic devices or viscous devices to suspend a plate/tread. For this reason, air spring suspension provides benefits in partially-suspended as well as fully suspended devices.

Air springs are available from several manufacturers in several sizes. In the present use, the air spring should provide a suitable suspension system for a wide range of user weight and ability. The force of the user's footfalls, and therefore the load on the treadmill suspension system, increases in proportion to the weight of the user and the speed at which the user walks or runs. The shock absorption capacity of air spring 25 should therefore increase as user weight and walk/run speed increases.

An air spring model 1B5-500 with sleeve type bellows manufactured by the Goodyear Tire and Rubber Company of Greensburg, Ohio, is suitable for use in the present invention. Fig. 3 contains a representative force vs. height curve for this air spring when inflated to 20 pounds per square inch (psi)(138 kPa) of air pressure. In the present invention, the initial at-rest position of air spring 25 will be its noncollapsed height. The noncollapsed height of the airsprings must be limited in actual use or unrestrained re-expansion of the airspring after compression will blow the airspring apart. In the preferred embodiment, studs with urethane bumpers are attached to plate 12 and travel through frame 19. When the user steps on the spring and releases, the urethane bumpers rest against the frame and keep airsprings 25 from overextending. Alternatively, compression springs may be used instead of bumpers.

For the air spring as configured, in Fig. 3, the initial noncollapsed position 37a corresponds to a spring height of approximately 3.8 inches (9.6 cm). As the user operates the treadmill, air spring 25 compresses in response to the person's weight and the impact force of the person's footfalls. A heavier or stronger person will impart more of a force to the treadmill and compress springs 25 further than a lighter or weaker person. By way of example only, a light-weight person, running slowly, might compress the spring from its initial height to a height of 3.5 inches (8.9 cm). At this height 37b, the spring of Fig. 3 returns a force of 125 pounds (556 N). A heavy person, running quickly, might compress the spring to a height of 2.5 inches (6.3 cm) 37c to which the spring responds with a larger magnitude force of approximately 275 pounds (1.22 kN).

The suspension system therefore provides a nonlinear response, returning a larger force for heavier, stronger users and a smaller force for lighter, weaker users. This nonlinear characteristic of the air spring suspension system ensures that the suspension does not become stiff as user size and or running speed increases and permits absorption of shockloads imparted to the treadmill by a wide spectrum of users.

The dynamics of air spring compression also provide an additional advantage to the air spring suspension system of the present invention over suspension systems employing other energy absorption devices. Air springs provide a smoother feel than conventional steel springs because air is a compressible gas and because of the unique design of the air spring. Furthermore, air springs absorb energy whereas steel springs return substantially all the energy. Air springs thus dissipate a significant portion of the impact and vibration energy as heat.

The inflatable nature of the air spring also means the suspension system can be further adjusted during routine servicing to accommodate users of different sizes and abilities as well as user preferences. Deflating the spring causes the load curve of Fig. 3 to shift vertically downward. The spring thus returns smaller magnitude forces at the lower inflation

value than are returned at the 20 psi inflation value graphed in Fig. 3. Conversely, inflating the spring to a value greater than 20 psi shifts the load/force curve vertically upward resulting in forces of increased magnitude. Varying the inflation level of the spring 25 can therefore be used to control the stiffness of the suspension system to accommodate both user size and user preference. The nonlinear load curve and adjustable inflation of air springs 25 enables the suspension system of the present invention to accommodate a wide range of users. People of all sizes and abilities, therefore, derive equal benefit from the suspension system.

Inflation of air springs 25 installed on the treadmill to the desired value is achieved, e.g., by removing the ply 12c to reveal the plywood middle layer 12b of three-ply plate 12. Holes cut in the plywood layer 12b give access to fill valve 36 located on the retainer 30 of air spring 25. An inflation value of 11-8 pounds per square inch (about 28-55 kPa) is satisfactory for most users. At lower inflation levels, the suspension system has a more forgiving feel.

Replacement of air springs 25 can be accomplished once ply 12c is removed by removal of frame sidepiece 20. As shown in Figs. 4 and 5, removal of bolts 42a-f permits removal of sidepiece 20 providing access to the air spring 25. Removal of bolts 43 allows removal of air spring. Air spring 25 can then be repaired or replaced by lifting plate 12 to clear the valve stem. Deflating the shock is required for replacement. Tread removal is additionally necessary for air spring replacement on the left side of the machine. Fig. 4A shows that removable sidepiece 20 is preferably formed from a channel beam 44. Channel beam 44 is a structural member of frame 19 and is therefore preferably fabricated as a single piece. The channel beam secures to frame 19 with six bolts, labelled 42a-f in the drawings. The bolt structure is designed such that the nut is retained in a spring clip structure 46 which is mounted as a plate directly behind channel 44. The bolt can thus be threaded through the sidepiece channel and into the nut from the outside of the sidepiece structure. This design eliminates the need for dexterous manipulations of nut and

wrench within the confines of the sidepiece channel structure.

Maintenance of internal components of the treadmill, in addition to replacement of air springs 25, can also be performed with sidepiece 20 removed. The plate on which the spring clip mounts also serves as an internal frame to keep the internal components in position when sidepiece 20 is removed. Plate 47 also serves to hold rollers 11a and 11b in position when sidepiece 20 is removed. The serviceable internal parts include air springs 25 rollers 11a and 11b, drive belt 18, and tread 10. With the sidepiece removed, top plate 12c can be relubricated by removing the fasteners that secure plate 12c to the underlying plywood plate 12b. The fasteners are exposed or are easily accessed since plate 12c is the top plate adjacent the tread. Plate 12c can then be slid out, lubricated and reinserted. In other machines of conventional design, personnel would somehow need to get underneath the tread by disassembly or with by using cumbersome apparatus to lubricate this layer. These items can either be repaired or replaced as appropriate. Other treadmill structures with an integral frame attached to the plate below the tread, require disassembly or removal of the belt, plate and/or outer structure to service these parts. The removable sidepiece system makes these maintenance tasks considerably easier, since only a single portion of the treadmill device must be disassembled to gain access to serviceable components and has the added benefit of providing a more aesthetically appealing treadmill than conventional designs. For example, replacement of tread 10 with sidepiece 20 removed can be accomplished by simply sliding the tread off rollers 11a-b. In contrast, treadmills not incorporating a removable sidepiece require disassembly of the plate from the frame and/or removal of the rollers to effect tread replacement. Maintenance of the treadmill of the present invention is less involved and less time consuming and proper maintenance is thus more likely to occur. The improved maintenance improves user safety and increases treadmill life.

The sidepiece structure of the treadmill of the present invention also makes the initial assembly of the system less complicated. The reduced complexity of initial assembly

reduces the manhours required to assemble the treadmill. The structure thus provides the additional benefit of reducing treadmill assembly costs.

With sidepiece 20 removed, however, the weight of the internal frame and components cause the machine to tilt towards the side from which sidepiece 20 was taken, and make servicing the machine difficult. While turning the machine on its side may eliminate this problem, the machine is heavy and floor space most likely limited. In the preferred embodiment of the invention, removal of sidepiece 20 tread replacement and servicing of treadmill components is made considerably easier by the ability to elevate the side of the treadmill containing the removable sidepiece as shown in Figs. 4-7.

Preferably, the apparatus provides one-sided elevation, to facilitate servicing, using the same device used for elevating to simulate an incline. To elevate the treadmill a rack 50 and pinion 52 mechanism, driven by an electric motor 54 is used. A rack 50 is located to each side of treadmill 10. A castor 55 located at the bottom of rack 50 supports the treadmill. Fig. 6 shows a front end view of the elevation mechanism. Each of the pinions 52 located in racks 50 is driven by a secondary shaft 56 and 58 connected to motor 54 through gearbox 60, and primary shafts 62 and 64. The pinion and its shaft may be formed of one piece called a stem pinion. In such a structure, parts 52 and 56 are a single piece.

Couplings 68 and 70 are used to couple primary shafts 56 and 58 to primary shafts 62 and 64, respectively. A quick disconnect coupling may be used. For example, a flexible coupling made by Atra, Inc. of Nantuckett Place, Santa Ana, CA 92703, may be used to couple the shafts. Fig. 7 shows the Atra-Flex® coupling. The coupling 79 includes a first hub 80 which mates with a second hub 82. The two identical hubs are made of high-strength cast iron or cast steel, each with four, six or eight teeth, depending on load and size. A split insert 84, which is made of specially compounded polyurethane, fits between the hubs. An outer steel holding ring 86 having no nuts or bolts secures the assembly. After hubs 80 and 82 and holding ring 86 are installed on the shafts, the teeth are then

aligned parallel to each other, but not touching. The elastic insert can then be installed in the slots formed by the parallel teeth. When the insert is in position, holding ring 86 can be slid onto the polyurethane insert. Centrifugal force will expand the elastic insert to fix it tightly to the inside of the steel ring. For disassembly, ring 86 is first removed. Insert 84 can then be removed and replaced without special tools, screws, bolts or other fasteners. The weight of the treadmill should be on the treadmill frame and not wheels 55 to facilitate disassembly.

The Atra-Flex® type coupling may be used to couple both shafts 56 and 62, and shafts 58 and 64 or may just be used to couple the shafts on the side of the treadmill not containing the removable sidepiece. The coupling on the side containing the removable sidepiece need not be of the quick disconnect type since this side will be elevated to facilitate repairs. An elastomeric jaw type flexible coupling may be used. For example, a Type L coupling made by Lovejoy, Inc. of 2655 Wisconsin Ave., Downer's Grove, Illinois 60515, may be used. Other coupling known to those of skill in the art may be used.

When motor 54 engages, shafts 56 and 58 rotate to drive pinion 52. As pinion 52 rotates, the teeth on pinion 52 engage the teeth on rack 50 thereby elevating the front of the treadmill. The rear portion of the treadmill remains on the ground and pivots about semicircular support structure 72 as the height of front portion increases. With both couplers in place, both sides of the treadmill will be lifted off the floor. This position can be used to simulate an incline and increase workout intensity. Fig. 8 shows a side view of the treadmill in the elevated position.

To tilt the treadmill for servicing, the user need only disconnect the left coupling (the coupling located on the side not containing the removable sidepiece). This action disengages secondary shaft 58 from primary shaft 64. Thus, when motor 54 activates, shaft 56 turns, but shaft 58 does not. That side of the treadmill containing removable sidepiece 20 is then elevated by the operation of the rack and pinion mechanism

caused by rotation of shaft 56. That portion of treadmill 20 which contains sidepiece 22 remains on the floor.

The preferred embodiment of the present invention has now been described. Various alternatives, modifications and equivalents will be readily apparent to those skilled in the art. For example, the bolt locations on removable sidepieces 20 can be altered providing the treadmill retains sufficient structural stability. Also, an aluminum block instead of a plain steel spring clip nut can be used. In addition, other, substitute materials may be used to fabricate the plate which supports the tread. Furthermore, although the embodiment described suspends only the bed portion of the tread support, those skilled in the art will recognize that both the frame and the bed can be suspended. In such an embodiment, however, the user must accelerate a larger mass on each step, i.e., the mass of the frame and the bed rather than just the mass of the bed. The platform can be suspended at more than four points. The present invention should therefore not be limited by the above disclosure and should be construed in light of the claims.

WHAT IS CLAIMED IS:

1. A suspension system for a treadmill system having a frame and a moveable endless surface comprising:

a platform, positioned with respect to said frame, over which said endless surface travels and which at least partially supports said endless surface; and

means, coupled to said platform and said frame, for fully suspending said platform with respect to said frame.

2. A suspension system, as claimed in claim 1, wherein:

said means for suspending said platform supports said platform at at least three points.

3. A suspension system, as claimed in claim 1, wherein:

said means for suspending said platform are arranged to form a parallelogram pattern.

4. A suspension system for a treadmill system having a frame and a moveable endless surface comprising:

a platform, coupled to said frame, over which said endless surface travels and which at least partially supports said endless surface; and

an air spring means, disposed between said platform and said frame, for suspending said platform and absorbing energy generated by a force exerted on said moveable endless surface.

5. The suspension system of claim 4, wherein said platform further comprises a three-ply plate.

6. The suspension system of claim 4, wherein said suspension system comprises four air springs.

7. The suspension system of claim 4, wherein said air springs are arranged to form a parallelogram pattern.

8. The suspension system of claim 4, further comprising:

a sidepiece removably attached with respect to portions of said frame; and

wherein removal of said sidepiece provides access to said air spring.

9. A treadmill system comprising:

a frame;

at least a first and second roller rotatably connected to said frame;

a platform movably connected to said frame;

a loop belt, substantially surrounding said first and second rollers, having an outer surface and an inner surface, wherein at least a portion of said inner surface is positioned adjacent to said platform; and

air spring means, suspending said platform, for absorbing energy generated by a force exerted on said belt.

10. The treadmill system of claim 9, comprising four air springs.

11. The treadmill system of claim 9, wherein said air springs are arranged to form a parallelogram pattern.

12. The treadmill system of claim 9, further comprising a motor coupled to said rollers which drive said belt.

13. The treadmill system of claim 9, wherein said frame further comprises a removable sidepiece, extending parallel to a longitudinal axis of said treadmill.

14. The treadmill system of claim 13 further comprising:

a means, coupled to said frame, for elevating a side of said frame containing said removable sidepiece.

15. The treadmill system of claim 14 wherein only one side of said frame, which contains said removable side piece, is elevated and a remaining side is not elevated.

16. A treadmill system with serviceable components, having a tread movably suspended on a frame and a means for driving said tread comprising:

a sidepiece removably connected with respect to portions of said frame; and

wherein when said sidepiece is removed access is provided to a serviceable component of said treadmill system.

17. The treadmill system of claim 16 further comprising:

a means, coupled to said frame, for elevating said portion of said frame containing said sidepiece.

18. The treadmill system of claim 17 wherein said means for elevating comprises:

a rack and pinion mechanism;

a motor device, coupled to said rack and pinion mechanism for driving said rack and pinion mechanism.

19. A treadmill system having a frame, a tread which travels around a set of rollers and a sidepiece, which extends parallel to a longitudinal axis of said treadmill, and which is removably connected to portions of said frame;

a first and second fastening means which attaches a first end portion of said sidepiece to a frame portion extending across a width of said treadmill;

a third and fourth fastening means adjacent said first end portion which attach said sidepiece to a portion of said frame extending parallel to the longitudinal axis of said treadmill; and

a fifth and sixth fastening means adjacent a second end portion of said sidepiece, which is opposite said first

end, which attach said sidepiece to the portion of the frame extending parallel to the longitudinal axis of said treadmill.

20. A treadmill system having a frame, a tread which travels around a set of rollers and a sidepiece, which extends parallel to a longitudinal axis of said treadmill, and which is removably connected to portions of said frame;

a first and second bolt which attaches a first end portion of said sidepiece to a frame portion extending across a width of said treadmill;

a third and fourth bolt adjacent said first end portion which attach said sidepiece to a portion of said frame extending parallel to the longitudinal axis of said treadmill; and

a fifth and sixth bolt adjacent a second end portion of said sidepiece, which is opposite said first end, which attach said sidepiece to the portion of the frame extending parallel to the longitudinal axis of said treadmill;

an electric motor mounted on said frame, coupled to a primary shaft;

a secondary shaft detachably coupled to said primary shaft;

a fastener for detachably coupling said primary shaft to said secondary shaft;

a pinion, coupled to said secondary shaft; and

a rack, connected to said frame, in which said pinion is engaged.

21. The treadmill system of claim 20 wherein said fastener comprises a quick disconnect coupling.

22. A method for a person to exercise on a treadmill system having a frame comprising the steps of:

walking on an endless surface wherein said endless surface travels over a platform positioned with respect to said frame; and

absorbing an impact of a footfall with a suspension system that fully suspends said platform with respect to said frame.

23. In a treadmill system having a frame, and an endless surface which travels over a multiply platform supported within said frame, a method for servicing said platform comprising the steps of:

removing a removable side piece of said frame to expose a cross section of said multiply platform;

uncoupling a top ply of said platform, adjacent said endless surface, from a remaining ply of said multiply platform; and

sliding said top ply out of said treadmill system frame.

24. The method for servicing of claim 23 further comprising the steps of:

lubricating said top ply;

sliding said top ply into said treadmill system frame; and

securing said top ply to said remaining ply of said multiply platform.

25. A method for servicing a treadmill system, having a frame and a means for elevating said frame,comprising the steps of:

elevating a side of said treadmill system using said means for elevating said treadmill; and

removing a removable side piece of said frame to access a plurality of serviceable components.

26. The method for servicing of claim 25 wherein said means for elevating said treadmill system comprises a drive means for elevating a first and a second sides of said treadmill system and further comprising the steps of:

disabling said drive means from elevating said first side of said treadmill system while enabling said drive means

to elevate said second side of said treadmill system containing said removable side piece.

27. The method for servicing of claim 25 wherein said step disabling comprises the step of:

decoupling a primary drive shaft of said drive means from a secondary drive shaft of said drive means wherein said secondary shaft is coupled to a rack and pinion mechanism.

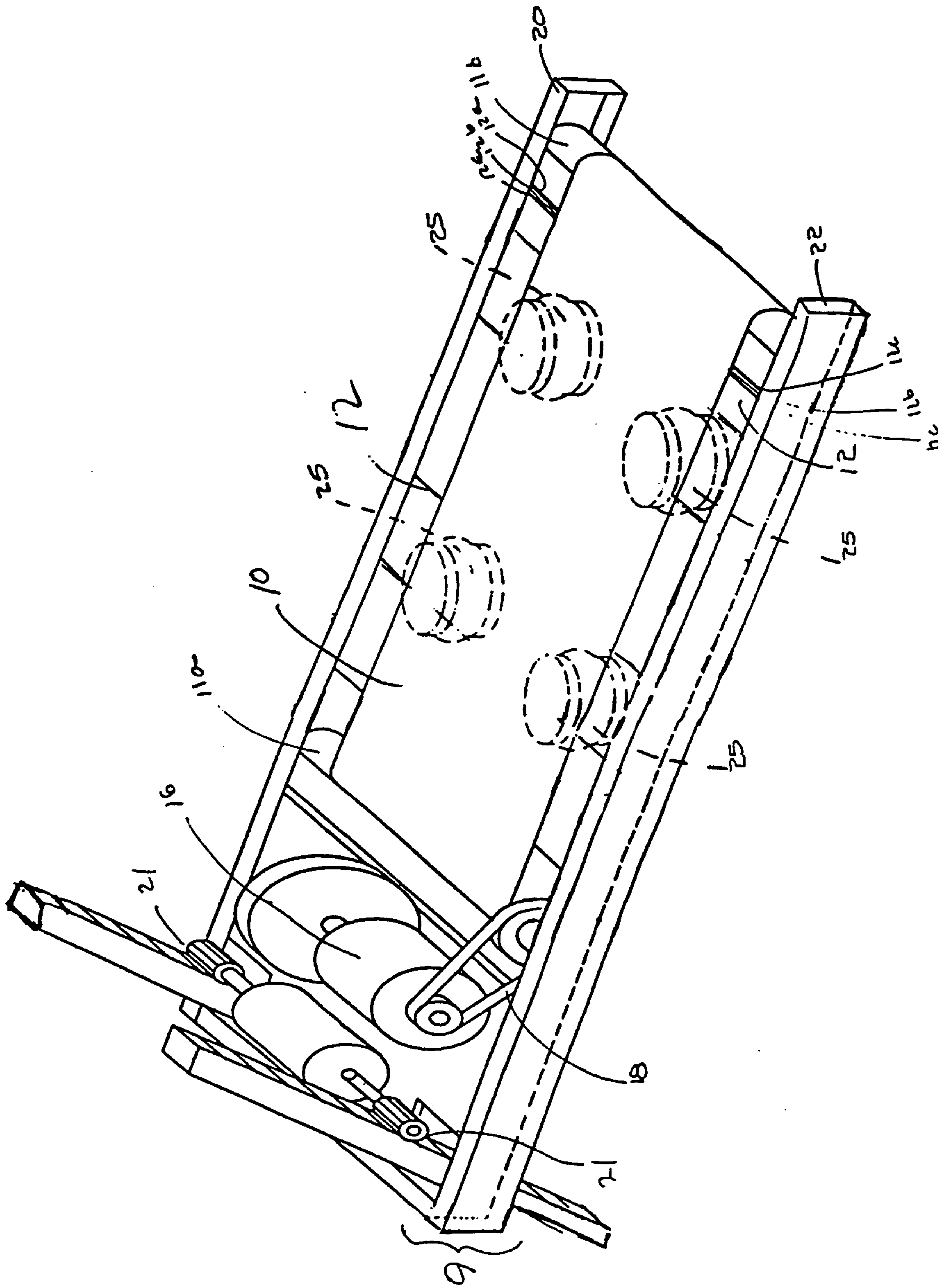

FIG. 1

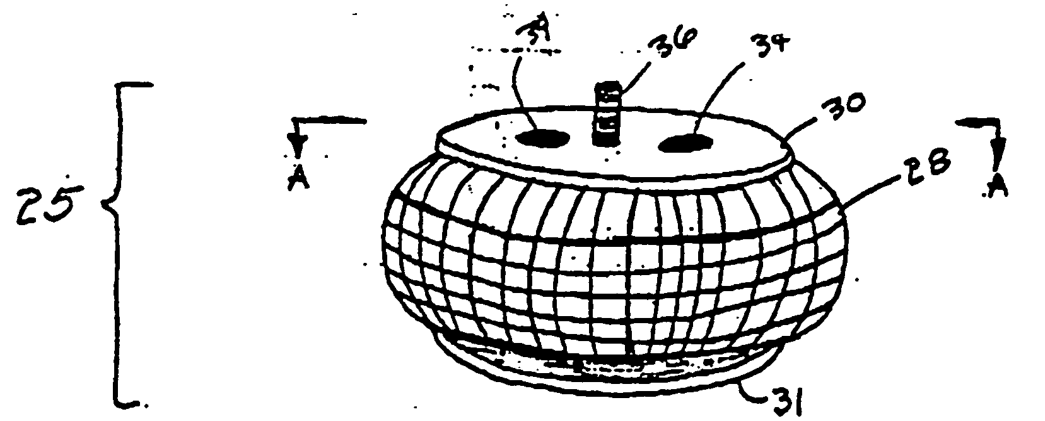

FIG 2A

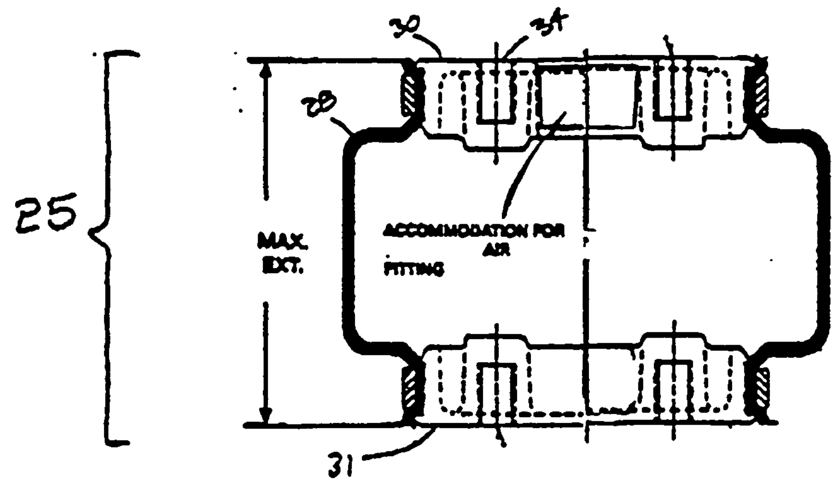

FIG 2B: SECTION A-A NONCOLLAPSED

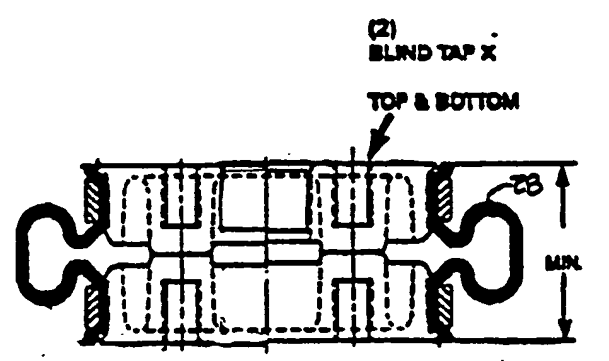

FIG.2C: SECTION A-A COLLAPSED

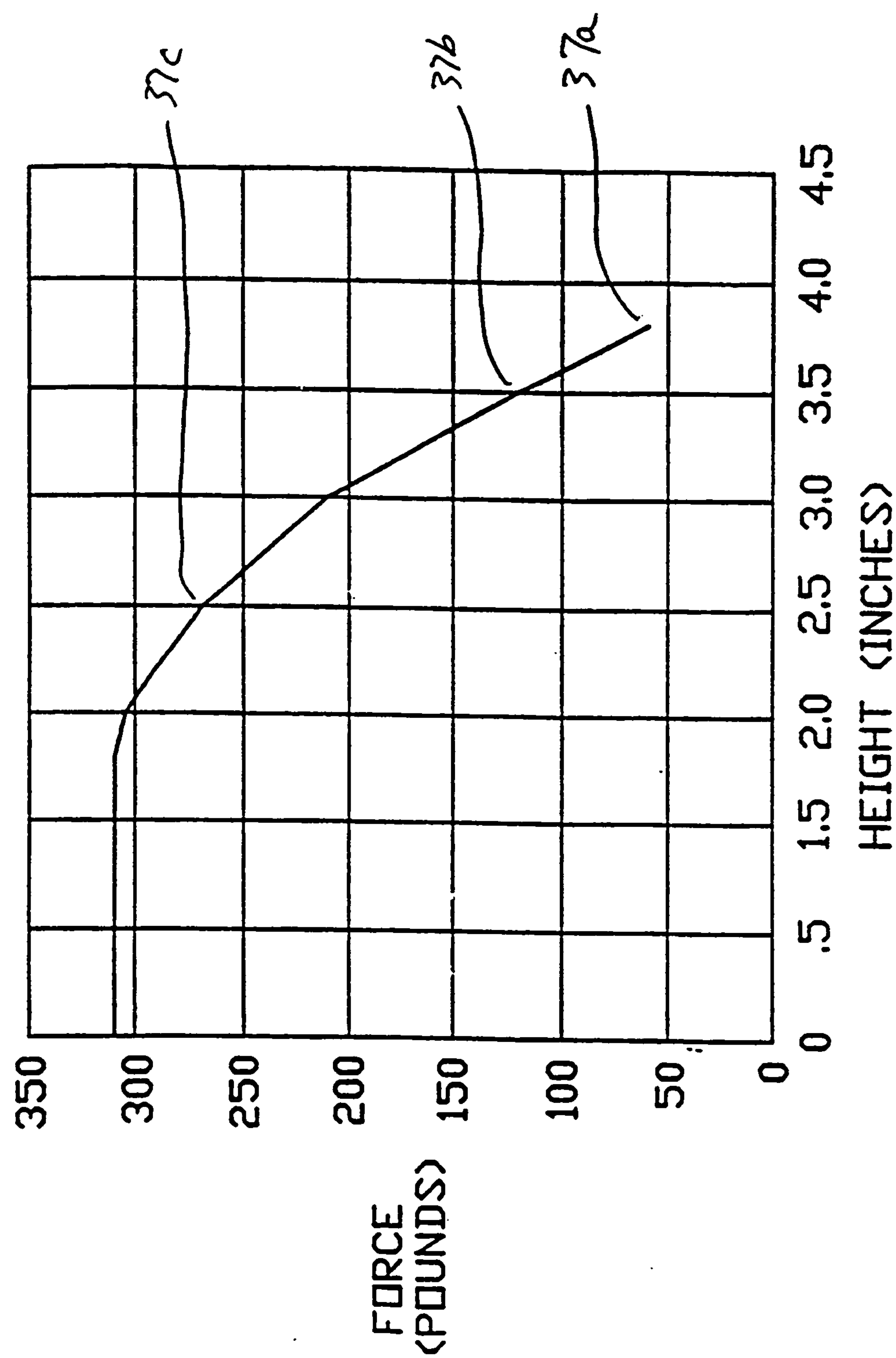
37c
37b
37a
FORCE (POUNDS)
350
300
250
200
150
100
50
0
0
.5
1.5
2.0
2.5
3.0
3.5
4.0
4.5
HEIGHT (INCHES)

FIG. 3

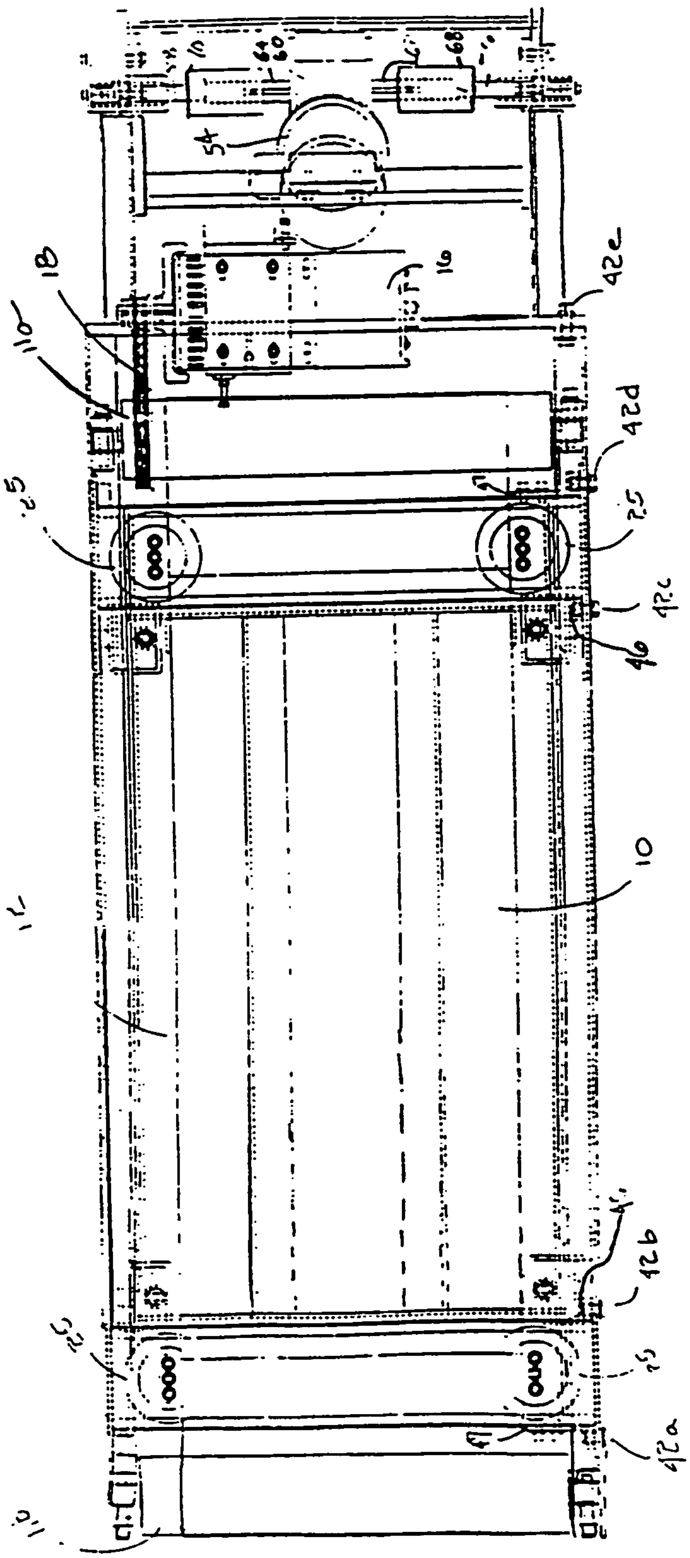

FIG. 4

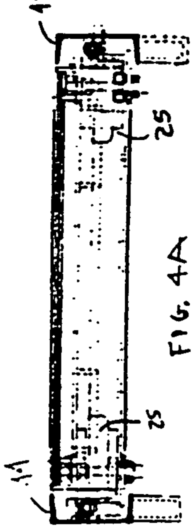

FIG. 4A

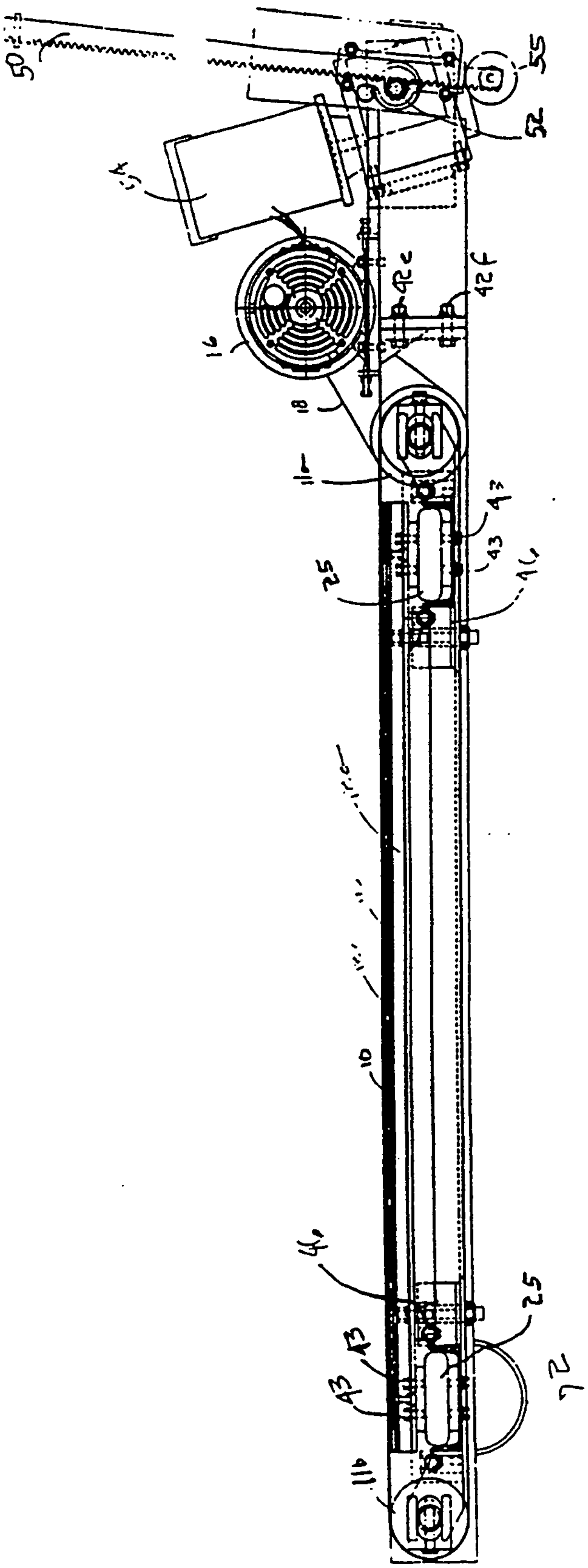

FIG. 5

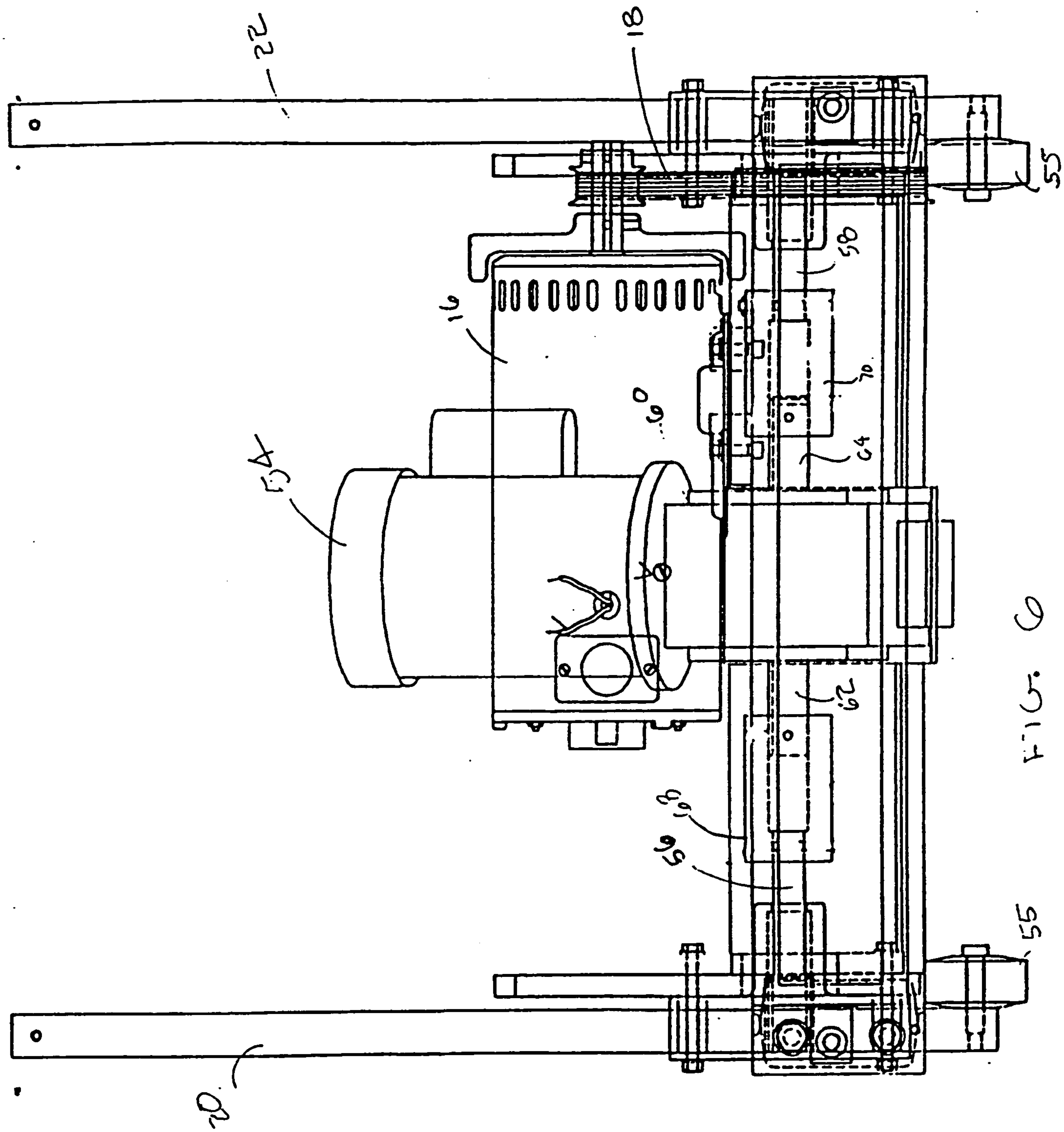

FIG. 6

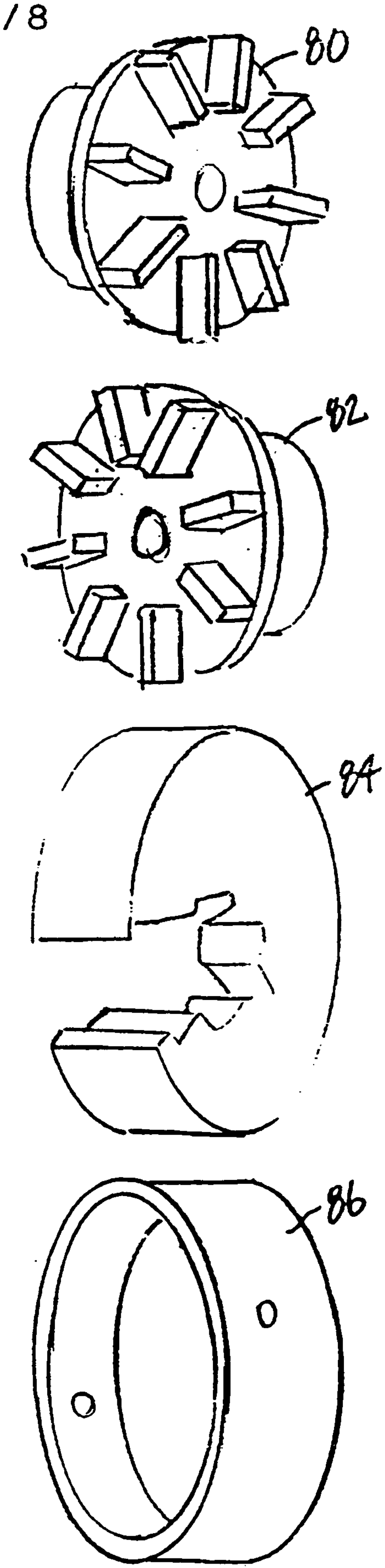

FIG_7.

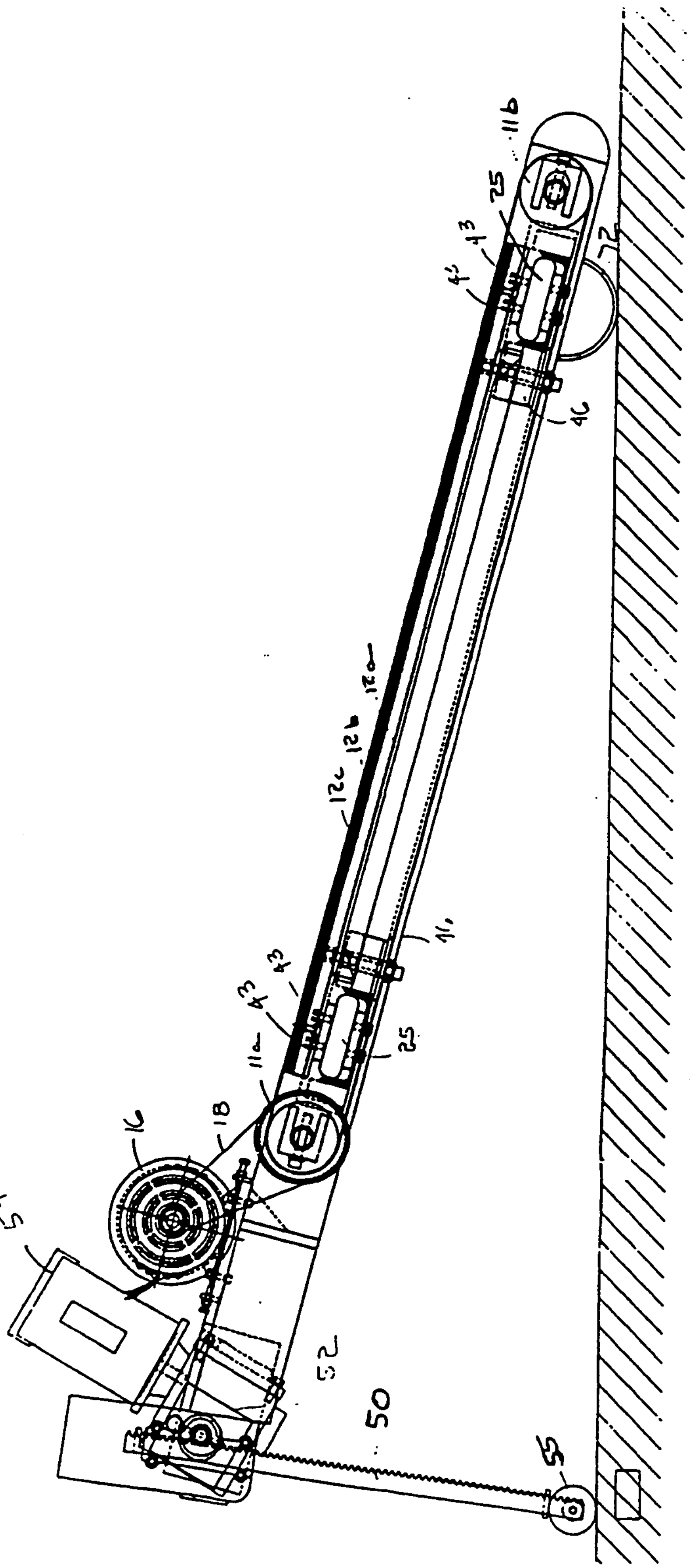

FIG. 8

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US92/00126

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC (5): A63B 22/02
U.S.Cl.: 482/54

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
U.S.	482/54,51

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
Y	US, A, 3,689,066 (HAGEN) 05 September 1972 See the entire document.	1-27
Y	US, A, 4,350,336 (HANFORD) 21 September1982 See the entire document.	1-27
Y	US, A, 4,844,449 (TRUSLASKE) 04 July 1989 See column 5, lines 61-68 onto column 6, lines 1-7.	18,20,25,26, 27

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
09 June 1992	23 JUN 1992
International Searching Authority	**Signature of Authorized Officer**
ISA/US	S. R. Crow

Form PCT/ISA/210 (second sheet) (Rev.11-87)